Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

The claims are unamended.

1-2. (canceled)

3. (previously presented) The substrate processing system of claim 11 wherein said processor receives as an input the measured impedance level of said plasma.

4. (previously presented) The substrate processing system of claim 3 further comprising a variable capacitor electrically coupled to said chamber and controllably coupled to said processor wherein said processor adjusts a capacitance level of said variable capacitor to vary the impedance of said plasma in response to an output of said impedance monitor.

5. (original) The substrate processing system of claim 3 further comprising a pressure control system configured to control a pressure level within said chamber and controllably coupled to said processor wherein said processor controls said pressure control system to vary the pressure within the chamber in response to the measured impedance level of said plasma.

6. (original) The substrate processing system of claim 3 wherein said processor controls said plasma power source to vary the power applied to the plasma in response to the measured impedance level of said plasma.

7-10. (canceled)

11. (previously presented) A substrate processing system comprising:

a deposition chamber comprising a reaction zone;

a substrate holder that positions a substrate in the reaction zone;

said substrate holder comprising a low frequency (LF) electrode;

a gas distribution system that includes a gas inlet manifold for supplying one or more process gases to said reaction zone;

said gas inlet manifold comprising a high frequency (HF) electrode;

a plasma power source for forming a plasma within the reaction zone of said deposition chamber, the plasma power source comprising a high frequency power supply coupled with the HF electrode and a low frequency power supply coupled with the LF electrode;

an impedance monitor comprising a first impedance probe electrically coupled to said high frequency electrode to measure the impedance at the HF electrode and a second impedance probe electrically coupled to said low frequency electrode to measure the impedance at the LF electrode; and

a processor coupled with the impedance monitor for adjusting processing conditions of the deposition chamber based on measurements by the first impedance probe and the second impedance probe.

12. (previously presented) The substrate processing system of claim 11 further comprising a variable capacitor electrically coupled to said LF electrode and controllably coupled to said processor wherein said processor adjusts a capacitance level of said variable capacitor to vary the impedance of said plasma in response to an output of said impedance monitor.

13. (previously presented) The substrate processing system of claim 11 further comprising an impedance tuner coupled in series to said substrate holder.

14. (previously presented) The substrate processing system of claim 13 wherein said impedance tuner is coupled between said substrate holder and a low frequency RF generator.

15. (canceled)

16. (previously presented) A substrate processing system comprising:

a deposition chamber comprising a reaction zone;

a substrate holder that positions a substrate in the reaction zone;

said substrate holder comprising a low frequency (LF) electrode;

a gas distribution system that includes a gas inlet manifold for supplying one or more process gases to said reaction zone;

said gas inlet manifold comprising a high frequency (HF) electrode;

a plasma power source for forming a plasma within the reaction zone of said deposition chamber, the plasma power source comprising a high frequency power supply coupled with the HF electrode and a low frequency power supply coupled with the LF electrode;

an impedance monitor electrically coupled to said high frequency electrode and said low frequency electrode;

a computer processor communicatively coupled to said impedance monitor so that said computer processor receives as an input the measured impedance level of said plasma;

a variable capacitor electrically coupled to said chamber and controllably coupled to said processor wherein said processor adjusts a capacitance level of said variable capacitor to vary the impedance of said plasma in response to an output of said impedance monitor; and

a matching network electrically coupled to a high frequency RF generator and said gas manifold, wherein said matching network has capacitors that are different than said variable capacitor.

17-18. (canceled)

19. (previously presented) The substrate processing system of claim 14, wherein said impedance tuner includes a variable capacitor.

20. (previously presented) A substrate processing system comprising:

a deposition chamber comprising a reaction zone;

a substrate holder that positions a substrate in the reaction zone;

said substrate holder comprising a low frequency (LF) electrode;

a gas distribution system that includes a gas inlet manifold for supplying one or more process gases to said reaction zone;

said gas inlet manifold comprising a high frequency (HF) electrode;

a plasma power source for forming a plasma within the reaction zone of said deposition chamber, the plasma power source comprising a high frequency power supply coupled with the HF electrode and a low frequency power supply coupled with the LF electrode;

an impedance monitor electrically coupled to said high frequency electrode and said low frequency electrode, said impedance monitor including an impedance monitor variable capacitor;

a processor communicatively coupled to said impedance monitor for receiving as an input a measured impedance level of said plasma;

a variable capacitor electrically coupled to said LF electrode and controllably coupled to said processor wherein said processor adjusts a capacitance level of said variable capacitor to vary the impedance of said plasma in response to an output of said impedance monitor; and

a matching network coupled between a low frequency RF generator and said variable capacitor, wherein said matching network includes capacitors that are different than said variable capacitor.

21-22. (canceled)

23. (previously presented) The substrate processing system of claim 4 further comprising an RF matching network electrically coupled to the chamber, and wherein the variable capacitor is separate from the matching network.

24. (previously presented) The substrate processing system of claim 16 wherein the impedance monitor comprises a first impedance probe connected to the HF electrode and a second impedance probe connected to the LF electrode.

25. (canceled)

26. (previously presented) The substrate processing system of claim 20 wherein the impedance monitor comprises a first impedance probe connected to the HF electrode and a second impedance probe connected to the LF electrode.

27. (previously presented) The substrate processing system of claim 11 wherein the processor is configured to adjust a pressure in the deposition chamber based on measurements by the first impedance probe and the second impedance probe.

28. (previously presented) The substrate processing system of claim 11 wherein the processor is configured to adjust at least one of a high frequency RF power level of the power source and a low frequency RF power level of the power source, based on measurements by the first impedance probe and the second impedance probe.

29. (previously presented) The substrate processing system of claim 13 wherein the processor is configured to adjust a setting of the impedance tuner based on measurements by the first impedance probe and the second impedance probe.

30. (previously presented) The substrate processing system of claim 24 wherein the computer processor is configured to adjust a pressure in the deposition chamber based on measurements by the first impedance probe and the second impedance probe.